

Pond E Sampling and Analysis Plan

The work is to consist of conducting in-situ dredge material sampling and analytical laboratory analysis at Pond E in general accordance with the requirements of Condition 11 of the Dominion VPDES Permit.

Project Background

Pond E was originally designed in 1967 and has been used as a settling basin for ash and other Coal Combustion Byproduct (CCB) material. Based on a review of the original 1967 design plans for Pond E and topographic mapping developed in March 2015 by GAI Consultants, Inc., it is estimated that Pond E contains approximately 870,000 cubic yards (CY) of ash. The depth of ash varies along the pond, but it is estimated that the maximum thickness of ash extends approximately 35 to 40 feet with an average thickness of approximately 15 feet. Pond E also has free water ponded over a portion of the ash. The pool elevation of the water varies with precipitation and the water depth varies across the pond. At the time of development of the topographic mapping in March 2015, it was estimated that the volume of ponded water is approximately 52.5 million gallons and extends to a depth of approximately 17 feet.

As part of the clean closure construction activities planned for Pond E, ash is proposed to be mechanically dredged from the pond and transported to Pond D. In order to meet the requirements of Condition 11 of the VPDES Permit, the dredge material must be sampled and analyzed to demonstrate compliance with specified requirements.

Scope of Work

The Pond E sampling and laboratory analysis will be completed in general accordance with applicable state and federal guidelines, regulations, and requirements as applicable to the subsurface conditions encountered. The sampling and laboratory analysis will evaluate the ash material for comparison to criteria established under Condition 11 of the VPDES Permit.

In accordance with Condition 11 of the VPDES Permit, for volumes greater than 300,000 CY, one representative sample is required for each 100,000 CY of dredge material. The sample should be a composite of the proposed dredge material to the depth of the intended dredge. Based on evaluation of the ash thickness and pond dimensions, the dredge volume from Pond E has been estimated to be approximately 870,000 CY. Using a volume estimate factor of 20% to account for additional volumes due to estimation error and over excavation of pond bottom material, the final estimated volume of dredge is 1,044,000 CY.

Based on an estimated 1,044,000 CY of dredge, and in accordance with the requirements of one sample per 100,000 CY of dredge material, the collection of a total of 11 representative samples plus one quality assurance/quality control (QA/QC) sample (12 total samples) is planned.

Task 1: Sample Location Determination

To facilitate collection of samples representative of the approximately 38 acre pond and estimated thickness of ash, a total of 11 soil borings will be advanced across Pond E. Boring locations will be selected using a systematic random sampling technique in order to generate a representative sampling of the pond material. Soil boring locations will be generated using the Visual Sampling Plan (VSP) Software. VSP is a software tool developed by Pacific Northwest National Laboratory (PNNL) for the United States (US) Department of Energy (DOE). The software was designed for selecting the right number and/or location of environmental samples so that the results of statistical tests performed on the data collected via the sampling plan have the required confidence for decision making.

Using the simple random sampling option of VSP, random sampling locations are generated within a pre-defined study area. Using the general perimeter of Pond E as the study area and specifying a total of 11 of sample locations, a sample location map is developed. Figure 1 presents the proposed sample locations generated using the VSP software. Coordinates for each sample location are provided in Table 1.

Task 2: Sample Collection

Soil borings will be advanced at the designated sample locations to facilitate collection of the required dredge material samples. At this time, this plan assumes soil borings advanced within the inundated portions of the pond will be advanced using a barge mounted drilling rig. Soil borings advanced within the dry ash areas of pond will be advanced using a track mounted drilling rig. It is anticipated that even within the drier portions of the pond area, matting may be required to provide stability and assist in the movement of the drill rig from one soil boring to the next. Soil borings advanced within the dry ash areas will be backfilled with auger cuttings.

In all cases, soil borings will be advanced from the ground/water surface to a depth of at least two feet below the bottom of the ash material or auger refusal, whichever is encountered first. If auger refusal is encountered prior to reaching the planned depth of boring, a maximum of three additional attempts will be made within ten feet of the original boring location. In the event that the planned depth of soil boring cannot be achieved within these limits, the boring location will be abandoned and a new location will be selected via the VSP software. Final depths of each soil boring will be determined in the field based on the observed thickness of ash observed and subsurface conditions encountered.

Soil borings will be advanced using a combination of continuous split-spoon sampling and hollow stem auger drilling. Each split-spoon sample will be examined by the GAI field environmental scientist immediately after removal from the sampler, visually characterized, and inspected for the presence of staining, discoloration, separate-phase hydrocarbon product, or other visible indicators of contamination. The split spoon samples will be scanned with a photoionization detector (PID), calibrated daily to isobutylene, for the presence and concentration of volatile organic vapors. Soil boring logs with ash/soil descriptions and PID readings for each of the soil borings will be prepared by the GAI environmental scientist.

GAI anticipates the collection of up to 12 environmental samples (one sample per soil boring plus one QA/QC sample) for laboratory analyses to evaluate the proposed dredge material. Sample collected for laboratory analysis of all parameters, excluding the volatile organic fraction, will be collected as a single composite from each soil boring. A composite sample will be collected by retaining a portion of each split-spoon retrieved from a given soil boring in a clean disposable container. Once the soil boring is complete, the retained sample will be transferred to a stainless steel mixing bowl and thoroughly mixed. The thoroughly mixed sample will then be transferred in equal portions to appropriate laboratory supplied sample jars.

For collection of the volatile organic fraction, each split spoon will be visually examined for the presence of suspected contamination and screened with a PID. Soil samples for volatile organic analyses will be selected from a discrete interval in each boring exhibiting the highest PID readings or other indicators of possible impacts. If no indicators of potential impacts are observed, the sample will be collected from a randomly selected depth interval. Selection of the depth interval will take into consideration previously completed soil borings in an effort to distribute samples between the top, middle and bottom thirds of the dredge material. Samples collected for the volatile organic fraction analyses will be transferred into the appropriate laboratory provided sample jars or pre-preserved sample vials depending on the analyses required.

Equipment used for sample collection will be properly decontaminated before use to prevent cross-contamination from prior sampling locations. Field sampling equipment used to collect or hold non-aqueous samples will be decontaminated prior to use as follows:

1. Remove visible contamination from the equipment using a brush and/or paper towel saturated with potable water and laboratory grade soap.
2. Rinse the equipment with potable water to remove residual soap and solids.
3. Rinse the equipment with distilled/deionized water meeting ASTM Type II specifications.

Task 3: Laboratory Analysis

Samples collected for laboratory analysis will be properly labeled with the sampling time, date, and sample identification, and will be immediately placed into an iced chest and maintained at four degrees Celsius. Samples will be submitted, under chain of custody procedures, to ALS Environmental, a VA certified analytical laboratory, under a standard turn-around for results. Samples will be submitted for analysis of the required parameters and using the laboratory test methods presented in Table 2.

Task 4: Reporting

At the conclusion of the field sampling effort, and after the receipt of the analytical results, a Sampling and Analysis Report will be prepared. The following information pertaining to the Pond E sampling and analysis will be reported:

- description of the field investigations and methods;
- surface/subsurface conditions encountered;
- analytical data and discussion/comparison to applicable criteria; and
- the potential need for additional studies based on the findings.

Schedule

The above scope of work is estimated to be completed within approximately eight weeks from a notice to proceed depending on Site access, Site conditions at the time of the investigations, and subsurface conditions/impacts encountered as outlined below:

Task	Duration (Weeks)	Comments
Site Mobilization	1	Mobilization of staff and subcontractors.
Soil Boring/Sample Collection	2	Assumes two field week
Laboratory Analysis	4	Standard laboratory turn around.
Sampling and Analysis Report	1	After receipt of all laboratory analysis.

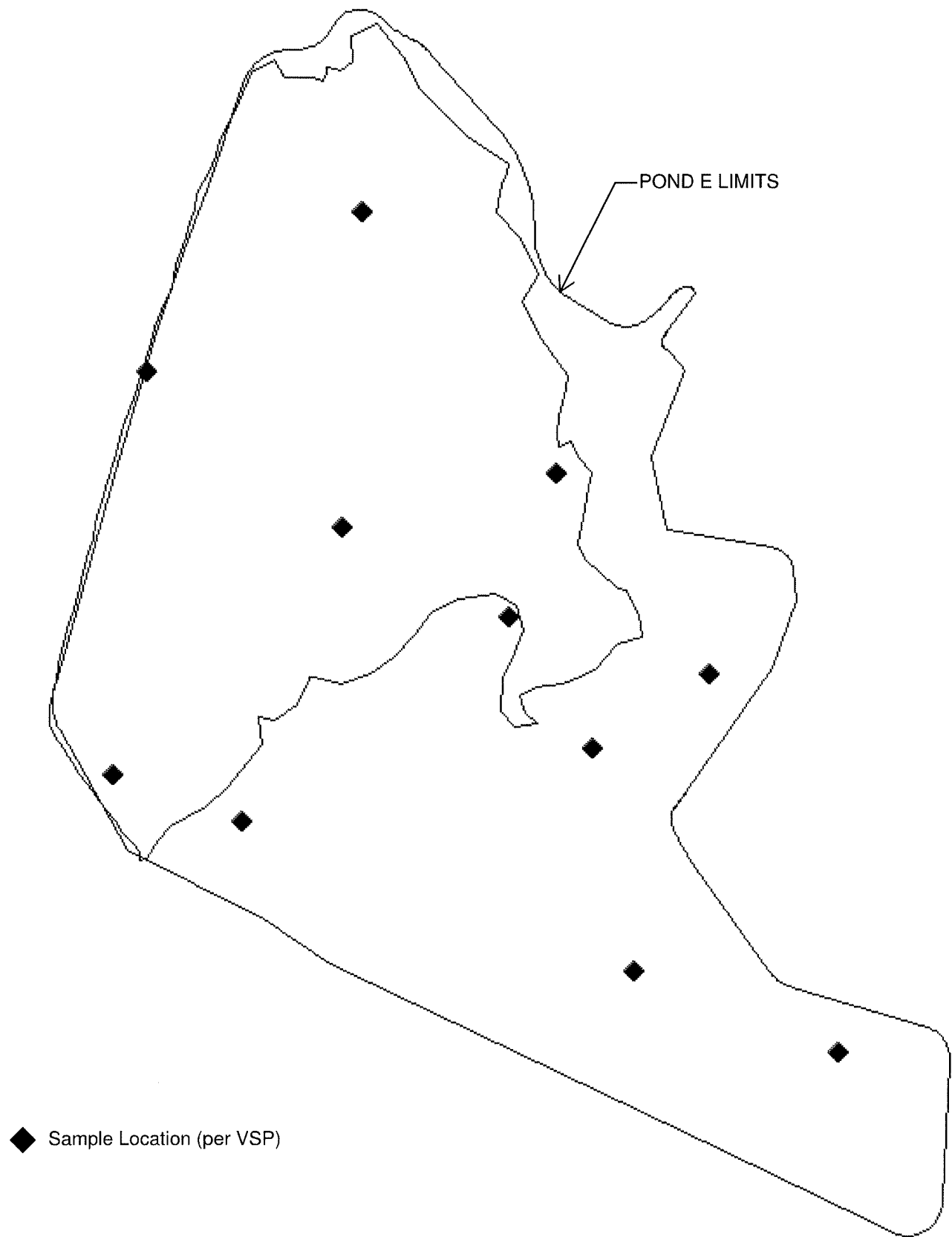


Figure 1 - Proposed Sample Locations
Pond E Sampling and Analysis Plan

Table 1
Pond E Sampling and Analysis Plan
Sample Location Coordinates

Sample Location	Easting	Northing
1	11827918.9358	8885761.494
2	11828310.0478	8886189.508
3	11828680.1251	8886282.258
4	11829167.2324	8885277.267
5	11827974.0594	8886458.809
6	11828943.7611	8885935.334
7	11828741.8521	8885806.314
8	11828813.0575	8885417.928
9	11828597.3039	8886032.982
10	11828344.6104	8886733.224
11	11828139.3530	8885679.380

Table 2
Pond E Sampling and Analysis Plan
Analytical Parameters and Methods

Parameter / Analysis	Method	Matrix	Quantity
TCLP Waste Characterization			
8 TCLP RCRA Metals (As, Ba, Cd, Cr, Pb, Hg, Se & Ag)	1311	ash/soil	12
TCLP (RCRA) Listed VOCs	1311	ash/soil	12
TCLP (RCRA) listed SVOCS	1311	ash/soil	12
TCLP Listed Pesticides	1311	ash/soil	12
TCLP Listed Herbicides	1311	ash/soil	12
TOTAL METALS (Part B.1)			
Sb, As, Cr, Cu, Ni, Tl, & Zn	6010B	ash/soil	12
Hexavalent Chromium	7196	ash/soil	12
Trivalent Chromium By Calculation	6010B-7196	ash/soil	12
Trivalent Arsenic - 15 DAY TAT	1632	ash/soil	12
Pesticides/PCBs (Part B.2)			
Part B.2 listed Chlorinated PCBs	8081	ash/soil	12
Guthion & Deneton	8141A	ash/soil	12
Malithion & Parathion	8141B	ash/soil	12
Chlorpyrifos Dursan	8141C	ash/soil	12
Kepone	8270D Appedix IX	ash/soil	12
(Part B.5)			
Part B.3 (32 listed) and Part B.5 (6 listed) BN & A	8270D	ash/soil	12
Volatiles (Part B.4)			
16 Part B.4 listed VOCs	8260B	ash/soil	12
Miscellaneous (Part B.6)			
Total Cyanide	9012	ash/soil	12
Tributyltin (TBT) - 15 day TAT		ash/soil	12
Total Petroleum Hydrocarbons by SGT-HEM	9071 MOD	ash/soil	12
% Solids (Dry Solids Factor)	SM2540G	ash/soil	12